

Claims

What is claimed is:

1. An architectural system comprising:

a triangular base comprising:

first, second and third complete struts substantially aligned along first, second and third axes (AB, BC, and AC) respectively, the axes all contained within a base plane, the first and third axes forming a first base angle CAB, the first and second axes forming a second base angle ABC, the second and third axes forming a third base angle BCA, one or more of the struts each comprising at least two rigid pieces able to move apart so as to produce a strut elongation;

a first node A engaging the first and third complete struts, the first node A "large enough" to maintain the first base angle CAB at a first positive value about equal to  $[j \times 20.9^\circ + k \times 31.7^\circ + m \times 36^\circ + n \times 37.4^\circ]$ , where j, k, m and n are each an integer less than three;

a second node B engaging the first and second complete struts, the second node B large enough to maintain the second base angle ABC at a second positive value about equal to  $[q \times 20.9^\circ + r \times 31.7^\circ + s \times 36^\circ + t \times 37.4^\circ]$ , where q, r, s, and t are each an integer less than three;

a third node C engaging the second and third complete struts, the third node C large enough to maintain the third base angle BCA at a third positive value less than  $60^\circ$ ; and

an extension engaging the triangular base and comprising a fourth complete strut substantially aligned along a fourth axis that forms a substantially acute angle  $> 3^\circ$  with the base plane.

2. The architectural system of claim 1 in which the fourth axis form an angle DAB with the first axis that is substantially equal to a reference angle selected from a group consisting of 13.3°, 15.5°, 20.9°, 22.2°, 31.7°, 35.3°, 36°, 37.4°, 37.8°, 41.8°, 44.5°, 45°, 54.7°, 58.3°, 60°, 63.4°, 65.9°, 69.1°, 70.5°, 72°, 75.5°, 76.7°, 79.2°, 82.2°, 90°, 97.8°, 100.8°, 103.3°, 104.5°, 108°, 109.5°, 110.9°, 114.1°, 116.6°, 120°, 121.7°, 125.3°, 135°, 135.5°, 138.2°, 142.2°, 142.6°, 144°, 144.7°, 148.3°, 155.9°, 157.8°, 159.1°, 164.5°, and 166.7°.
3. The architectural system of claim 1 in which the fourth axis form an angle DAB with the second axis that is substantially equal to a reference angle selected from a group consisting of 13.3°, 15.5°, 20.9°, 22.2°, 31.7°, 35.3°, 36°, 37.4°, 37.8°, 41.8°, 44.5°, 45°, 54.7°, 58.3°, 60°, 63.4°, 65.9°, 69.1°, 70.5°, 72°, 75.5°, 76.7°, 79.2°, 82.2°, 90°, 97.8°, 100.8°, 103.3°, 104.5°, 108°, 109.5°, 110.9°, 114.1°, 116.6°, 120°, 121.7°, 125.3°, 135°, 135.5°, 138.2°, 142.2°, 142.6°, 144°, 144.7°, 148.3°, 155.9°, 157.8°, 159.1°, 164.5°, and 166.7°.
4. The architectural system of claim 1 in which the fourth axis form an angle DAB with another of the axes that is substantially equal to a reference angle selected from a group consisting of 13.3°, 15.5°, 20.9°, 22.2°, 31.7°, 35.3°, 36°, 37.4°, 37.8°, 41.8°, 44.5°, 45°, 54.7°, 58.3°, 60°, 63.4°, 65.9°, 69.1°, 70.5°, 72°, 75.5°, 76.7°, 79.2°, 82.2°, 90°, 97.8°, 100.8°, 103.3°, 104.5°, 108°, 109.5°, 110.9°, 114.1°, 116.6°, 120°, 121.7°, 125.3°, 135°, 135.5°, 138.2°, 142.2°, 142.6°, 144°, 144.7°, 148.3°, 155.9°, 157.8°, 159.1°, 164.5°, and 166.7°.
5. The architectural system of claim 4 in which one of the struts has a maximum diameter D and in which one of the nodes has a radius R that is not less than D/2.
6. The architectural system of claim 4 in which the extension comprises a polygon having N sides each occupied by a respective complete strut, the third axis containing one of the N sides, the fourth axis containing another of the N sides.

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7. The architectural system of claim 4 in which  $j=0$ .
8. The architectural system of claim 4 in which  $j$  and  $q$  are both even.
9. The architectural system of claim 4 in which  $j=1$ .
10. The architectural system of claim 4 in which  $n$  and  $t$  are both even.
11. The architectural system of claim 4 in which each of the nodes has a radius  $R$  and in which each of the struts has a respective diameter less than  $2R$ .
12. The architectural system of claim 4 in which the second node includes first and second couplings respectively engaging the first and second complete struts, the first coupling capable of retaining the first strut under a tension of 100 Newtons along the first axis (AB), the second coupling capable of retaining the second strut under a tension of 100 Newtons along the second axis (BC).
13. The architectural system of claim 4 in which the struts are primarily composed of a non-metallic material.
14. The architectural system of claim 4 in which  $m=0$ .
15. The architectural system of claim 1 in which  $m=0$ .
16. The architectural system of claim 1 in which  $j \neq q$ .
17. The architectural system of claim 1 in which  $q < 2$ .

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18. The architectural system of claim 1 in which  $k=0$ .

19. The architectural system of claim 1 in which  $k$  and  $r$  are both even.

5 20. The architectural system of claim 1 in which  $k \geq 1$ .

21. The architectural system of claim 1 in which  $n=t$ .

22. The architectural system of claim 1 in which  $j=0$ .

23. The architectural system of claim 1 in which  $j$  and  $q$  are both even.

24. The architectural system of claim 1 in which  $j=1$ .

25. An architectural system comprising:

means for assembling and supporting first, second and third rigid struts substantially aligned in a common plane; and

means for supporting a fourth complete strut so as to extend out of the common plane at a substantially acute angle  $> 3^\circ$ .